

Android-based Decision Support System for Career Decision Making of Junior High School Students in Specialization Program Preparation

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Abstract:

This study aims to develop an Android-based *decision support system* with probabilistic mathematical models to provide recommendations on the possibility of success on certain field of study on specialization program for junior high school students. The program was tested on 35 seventh grade junior high school students to understand their perceptions about the benefits of the system. The result showed that the students feel satisfied and get the benefits of using the system to assist them in determining the choice of further study in senior high school either SMA/MA or SMK. Integrated data becomes the highest reason for student satisfaction regarding the quality of choice and the effectiveness of further study options upon using this system.

Keywords: Android, Support System, Decision Making, Students

I INTRODUCTION

Student specialization program is a core activity that is required through the implementation of the 2013 Curriculum. As stated in the Ministry of Education and Culture Regulation (Permendikbud) No. 64 of 2014, specialization in senior high school (SMA/MA) has the aim to provide opportunities for students to develop attitude competency, knowledge competency, and skill competency of the students according to their interests, talents and/or academic abilities in a group of scientific subjects. Meanwhile, specialization in SMK/MAK has the aim to provide opportunities for students to develop attitude competency, knowledge competency, and skill competency of the students according to their interests, talents and/or abilities in vocational field, vocational programs, and vocational packages.

The specialization process begins when students enter the ninth grade of Junior High School where in addition to thinking about

preparing for the exam, they must also make a choice of study at the next level. It is not easy for junior high school students to determine their specialization choices as desired. Skills are required to make decisions related to the choice of study in order that they can develop properly, and achieve optimal development [1], [2]. The career decision-making process is not an instant activity, but an activity of gathering information about various things that include the options that are available in front of the students to be formulated into a decision that manifests good career decisions [3]. The problem that often arises in the career decision-making process besides the lack of information is the lack of *self-efficacy* and high gender awareness that suppresses the students' feelings so that confusion arises in decision-making [4]. The inability of students to extrapolate the obtained information with the expected pattern of study development also becomes another problem that often arises in decision-making [5].

A number of research have been conducted to improve career decision-making skills in students. The first study applied the principles of *career decision making self-efficacy*(CDMSE) as a basis to help vocational students make career planning, the results of which produced an increase of 58.2% in students' career decision making abilities [6]. The shortcoming of this research was the tendency of using conventional efforts with learning activities in class; thus, it had the risk of causing boredom for students in class. In another study, an effort has also been attempted to make computer-assisted career guidance efforts to help improve students' autonomous learning [7]. However, the subjects chosen at that time were high school students who had been in certain majors so that the truth if the same material was applied to Middle school students also gets the same results had not been confirmed. This research was actually inspired by the development of the *Computer Assisted Guidance System* by Pierce-Price which was originally developed to assist students choose higher education [8]. In further research, multimedia development for career decision skills has also been developed, but it is still conducted with senior high school students as the subject [2]. Interventions to career choices will determine the readiness and positive attitudes towards career planning [9]. Consequently, it is necessary to prepare as best a program as possible to facilitate the capacity development and skill development to decide and determine the next career program.

As an alternative media, *Decision Support System (DSS)* that is developed with an Android-based system becomes an option to aid students determine their choice of further study. It is known that Indonesia has more than 100 million smartphone users, the average of whom are using smartphones operated with the Android operating system [10]. Among these 100 million users, there are 39% of users who are categorized as teenagers with the range of age between 11-18 years [11]. This data shows the great potential of using

android as a learning medium and providing career guidance services.

DSS is actually not new. Many systems have been developed to help people get the ease in their daily activities. As an instance, in banking world, DSS has been developed to help make consumer credit decisions [12]. This certainly helps banking management to stabilize decisions related to credit proposals [13]. In agriculture, DSS is also used to predict the risk level of long-term rice production [14]. In the field of education, this program is adopted to help provide decisions in educational services. One of them was the development of GAKIN by the Ministry of Health Polytechnic Semarang to help determine scholarship recipients. The results showed 99.85% accuracy for determining low-income scholarship recipients [15]. This program is very likely to be adopted to assist students in further study decision-making process.

The developed Android-based DSS aims to help students take further study decisions at senior high school level, either SMA/MA or SMK. The product of developed program will contain information about *self-assessment* data that contains information on tracking the talent, interests, abilities and personal background of students, information about majors in senior high school and vocational high school as well as recommendations of choice of majors that become the priorities starting from the highest possible success to the lowest rate of success. The segmentation that is targeted as the users is the 8th and 9th grade junior high school students who will prepare for further study at senior high school, either SMA/MA or SMK. The previously arranged program provided more preparation for senior high school students who would enter higher education or choose working field options [7][16][8][6]. Other programs, despite its attempt to facilitate the status quo in junior high school student specialization, the selected program (*Flash*) is now widely abandoned by users [2]. This DSS program enhances the programs that have been prepared previously in terms of the

substance, assessment and *software* so that it has good use and accessibility value for junior high school students.

II PRELIMINARIES

This section will explain how the concept of *Decision Support System* helps students make

their career decisions especially for the selection of further study after junior high school.

DSS is an interactive system developed to help find a solution to problems with semi-structured and unstructured systems to improve decision quality [17]. Conceptually, the DSS model can be observed in Figure 1.

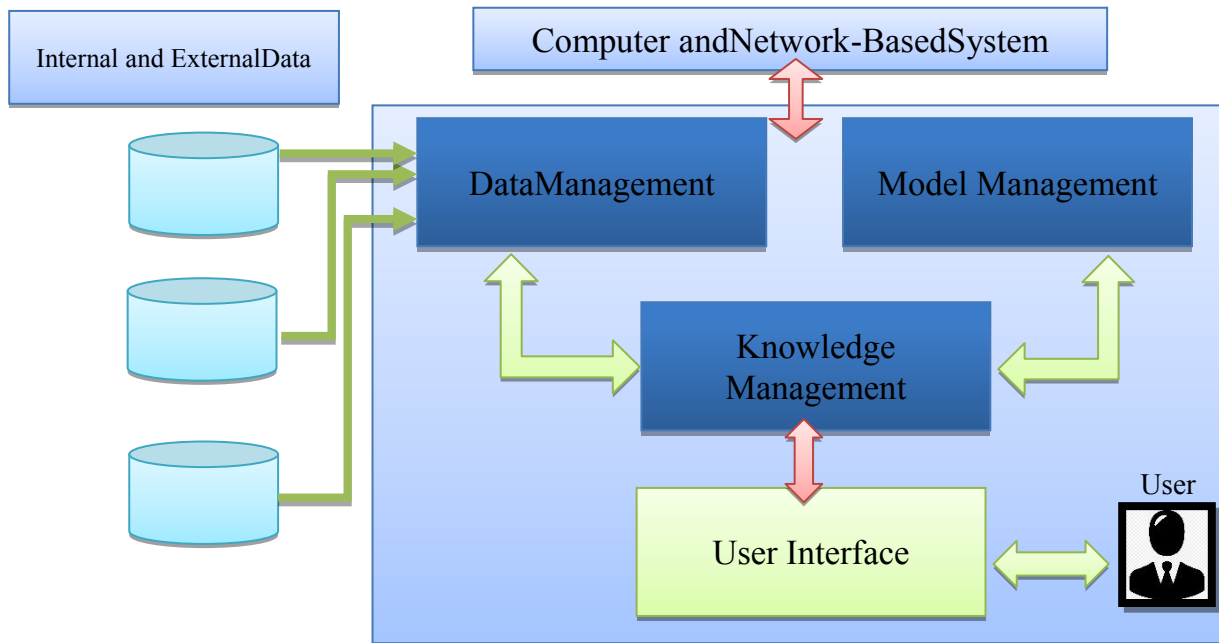


Fig.1. DSS Components

Based on Figure 1, it can be described that DSS includes the process of managing knowledge through computer aids with data processing through a data analysis model for the user to utilize in decision-making. In regards to the context of specialization, the processed data come in the form of personal data of students, psychological condition data of students in the form of processed products of inventory talent or aptitude tests, interest tests and or interest questionnaire, student achievement, and aspirations of parents. The model used is a probabilistic mathematical model that produces recommendations in the form of the possibility of success to support students' specialization decision.

1.1. Data Management

Data is managed to include the relevant data regarding aptitude tests, interest tests, multiple intelligence inventory, students' interest questionnaire, student learning outcomes and parents' interest questionnaires. The data is weighted to produce a recommendation for decision making for students.

1.2. Probability Model in Decision Making of Post-Junior High School Further Study

As explained in the previous chapter, probability management will be carried out to the data obtained by giving weight to each component. In detail, the weighting process is conducted as shown in table 1.

Table 1
Proportion of Success Probabilities of Specialization Components

No	Personal Components	Instrument	Item Weight
1	Intelligence and Talent	Differential Aptitude Test	40%
2	Interest	Multiple Intelligence Learning Interest Test Students' Interest Parents' Interest	35%
3	Learning achievement	Subjects	25%

Based on table 1, it can be identified that the portion of talent is the biggest consideration in determining career choices. This is in line with what is mentioned by Holland that personal characteristics including talent component is an important factor in career decision making process [18][19]. In other studies, self and others' aspirations are also taken into consideration in career decision-making process even if they are not a priority choice [20]–[22]. The weighting as listed in table one is employed to help recommend the probability of students' success in choosing further study interests at the next level.

III RESULT AND DISCUSSION

DSS software was tested on 35 students in Dawe 1 Junior High School. The 8th grade students were selected to provide initial information about themselves and the opportunities of study options available before them. After that, the measurement of satisfaction with accessibility software that includes (1) the convenience to help with the work, (2) the usefulness for the selection of studies, (3) the improvement of the effectiveness of selection, and (4) the development of the learning ability was performed. The results obtained the data as shown in table 2.

Table 2
Students' perceptions about DSS accessibility

No	Accessibility Components	Satisfaction Perception	
		Number	Percentage
1	The convenience to assist in the selection of studies	32	91%
2	The usefulness for the selection of studies	29	83%
3	The improvement of the effectiveness of selection	30	86%
4	The development of the learning ability	30	86%

Based on table 2, it can be identified that 91% of students feel assisted in choosing further study after using the DSS application. This perception is very important so that a *software* can really be utilized by students [23]. The perception of usefulness and effectiveness to help choose

further studies also increased by 83% and 86% respectively. This shows that there is an increase in the quality of the product selection for further studies for students which indicates the justification of previous research that exhibits that DSS can improve the level and quality of the

product [12]. Its effectiveness and accuracy are also tested as has also been proven in the research conducted by Nasher and Bahtiar [15]. Data integration contained in the developed system has been able to develop students' learning abilities, especially to choose further study. This obviously supports the theory that the principle of integrated control will support a decision making [24].

The process is a continuous process that experts say will lead to anxiety and doubt until leading to the process of coping stress on students [5]. Therefore, a tool to make decisions starting from exploring information, planning, analyzing to making career decisions is a necessity [8]. Through the developed Android-based DSS, students get the opportunity to dig up information about their intelligence, talents, interests, and information about the field of study for further education in senior high school, either SMA/MA or SMK. This information is then used as the material for analysis to plan study options that lead to the selection of quality advanced studies with marked conformity with personal characteristics and environmental aspirations. Previous research has shown that the ability to combine personal understanding with environmental aspirations will support one's career achievement [5], [25]. Hence, it is not surprising that students' perceptions of the usefulness and effectiveness of this tool are high. Cognitive barriers such as self-efficacy and gender perspective [4] that often interfere with the study selection process are tried to be neutralized by including parents' aspirations because parents naturally choose a career by considering who their children are.

This research shows that there is a significant role played by the system to make student study selection decisions. This certainly must continue to be developed to obtain a more perfect application, especially in the aspect of data substance that is more complete and predictive in regards to the level of study success. More integrated data will increase students' rationality in the decision-making process so that it supports

the efficacy and quality of the decisions [26]. Multipotency and diversity of variations in students' interests must be directed with appropriate tools so that students gain success in their studies [27]. The ability of counselors to accompany and operate this system displays the level of competitiveness of counselors in the era of the industrial revolution 4.0 [28].

IV CONCLUSION

Based on the description above, it can be concluded that students consider Android-based DSS to be very useful and help them improve the quality and effectiveness of further study options in specialization programs. Integration of information and accessibility of students for self-exploration and career choices is one of the reasons for the high satisfaction of students. As a follow up, the researcher recommends that this Android-based DSS continue to be developed especially by increasing the variability of data substance integrated in the system. This is required to overcome the dependence on the psychological test data that not all students and even schools have.

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